

FITTING AND PIPE SECTION FOR JETTED BATH HEATERS

CROSS-REFERENCE TO RELATED APPLICATION

This application is a Divisional Application of U.S. Patent Application
5 No. 09/805,673, filed March 12, 2001, priority from the filing date of which is hereby
claimed under 35 U.S.C. § 120 and 121, and the disclosure of which is hereby expressly
incorporated by reference.

FIELD OF THE INVENTION

The present invention relates to methods for installing heaters for jetted baths,
10 spas, above ground pools and the like, and particularly to methods for installing heaters in
fitting and pipe sections that may be pre-installed to assist in the subsequent installation
of a heater to the jetted bath.

BACKGROUND OF THE INVENTION

Jetted baths include tubing that circulates water from the bath, through a pump,
15 and back into the bath through jets. Jetted baths may be provided with a heater in the
tubing circuit, that acts to maintain bath-water temperature after filling. Often it is
advantageous or necessary to install these devices after the initial construction of the
jetted bath (or other personal soaking reservoir), or after home installation of the jetted
bath. Post-construction installation of these devices enables a limited number of product
20 variations to be produced by a manufacturer, which can be modified later to meet the
particular needs of an end user. This has the advantage of limiting manufacturing and
purchase costs.

However, at present, post-construction installation typically will depend on a
skilled plumber to cut or open the tubing of a jetted bath and affix a device in fluid flow

communication with the jetted bath. This is often expensive and inconvenient for the end user. Thus, there exists a need for a method for post-construction installation of a heater within a jetted bath that does not require a skilled plumber. Further, there exists a need for a method of post-construction installation of a heater that insures that the heater is placed and attached in a predetermined location and manner.

SUMMARY OF THE INVENTION

In accordance with one embodiment of the present invention, a method of modifying a jetted bath to accept a close fit heater device using a fitting and pipe section assembly adapted to be installed in a segment of tubing of the jetted bath is provided.

10 The method includes cutting a fitting and pipe section assembly along a first indicia disposed at a first end of a center segment of a fitting and pipe section assembly. The method further includes removing the center segment from the fitting and pipe section assembly and defining a gap between a first end fitting and a second end fitting of the fitting and pipe section assembly. The method still further includes inserting a close fit

15 heater device in the gap. The method still further yet includes securing the close fit heater device in fluid communication with the first and second end fittings with a fastening assembly.

In accordance with another embodiment of the present invention, a method of forming a fitting and pipe section assembly to permit the mounting of a close fit heater device in fluid communication with a segment of tubing of a jetted bath is provided. The method includes forming a first end fitting on a first end of a pipe section and a second end fitting is formed on a second end of the pipe section. The method further includes forming a first indicia between the first end fitting and the second end fitting to guide cutting of the pipe section. The method further still includes forming a second indicia

20 between the first end fitting and the second end fitting to guide the cutting of the pipe section.

In accordance with still another embodiment of the present invention, a method of modifying a segment of tubing of a jetted bath to accept a close fit heater device is

provided. The method includes forming a first end fitting is formed on a first end of a pipe section and a second end fitting is formed on a second end of the pipe section. The method further includes coupling the first and second end fittings in fluid communication with a segment of tubing of a jetted bath. The method still further includes forming a first cutting guide between the first end fitting and the first end of the pipe section to guide the post installation cutting and removal of a center segment of the pipe section. The method still further yet includes forming a second cutting guide between the first end fitting and the second end fitting to guide the post installation cutting and removal of the center segment.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects and many of the attendant advantages of this invention will become better understood by reference to the following detailed description, when taken in conjunction with the accompanying drawings, wherein:

FIGURE 1 is a side view of a fitting and pipe section according to the present invention;

FIGURE 2 is a side view of a fitting and pipe section connected to a tubing segment;

FIGURE 3 is a side view of a fitting and pipe section where the center segment has been removed;

FIGURE 4 is an exploded view of a fitting and pipe section where the center segment has been removed and replaced with a close fit device and a split nut fastening assembly;

FIGURE 5 is a perspective view of a split nut fastening assembly;

FIGURE 6 is a cut away view of a fitting and pipe section where the pipe section has been removed and replaced with a close fit device and a split nut fastening assembly;

FIGURE 7 is a perspective view of a fitting and pipe assembly where the pipe section has been removed and replaced with a close fit device and a split nut fastening assembly;

FIGURE 8 is an exploded view of a fitting and pipe section where the pipe section has been removed and replaced with a close fit device and a union nut fastening assembly;

FIGURE 9 is a side view of a T shaped fitting and pipe section according to the present invention;

FIGURE 10 is a side view of a transverse pipe branch of a T shaped fitting and pipe assembly;

FIGURE 11 is an exploded view of a T shaped fitting and pipe section where the pipe section has been removed and replaced with a T shaped close fit device and a split nut fastening assembly; FIGURE 12 is a cut away view of a T shaped fitting and pipe section where the pipe section has been removed and replaced with a T shaped close fit device and a split nut fastening assembly; and

FIGURE 13 is a perspective view of a T shaped fitting and pipe section where the pipe section has been removed and replaced with a T shaped close fit device and a split nut fastening assembly.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

A first embodiment of a fitting and pipe section assembly 10 constructed in accordance with the present invention is shown in FIG. 1. The fitting and pipe section assembly 10 is suitable for installation in an existing tubing network into which water is drawn, treated, and then reintroduced into a jetted bath. The fitting and pipe section assembly 10 makes it possible to modify previously constructed and/or installed jetted baths to accept a "water treatment device," which is intended herein to mean a heater for raising or maintaining bath-water temperature.

The fitting and pipe section assembly 10 includes a pipe section 12 and first and second fittings 18A and 18B, and is marked with first and second indicia 17A and 17B. The pipe section 12 has a center segment 16 disposed between inlet and outlet end portions 14A and 14B respectively. The first and second fittings 18A and 18B are disposed on the inlet and outlet portions 14A and 14B of the pipe section 12 respectively. The first and second indicia 17A and 17B on the pipe section 12 define the center segment 16 of the pipe section 12, and guide post-installation cutting of the pipe section 12 at predetermined points. In one embodiment, the fitting and pipe section 10 is a unitary/integrally formed body.

Referring to FIG. 2, the fitting and pipe section assembly 10 is capable of being installed in tubing 20A and 20B of a jetted bath. The inlet and outlet end portions 14A and 14B may be coupled in fluid flow communication to an inlet and an outlet of the tubing 20A and 20B respectively. The fitting and pipe section assembly 10 may be coupled to the tubing 20A and 20B by adhesive, corresponding grooves and threads, or other known methods. Although FIG. 2 shows tubing 20 secured inside of the fitting and pipe section assembly 10, it will be understood that the fitting and pipe section assembly 10 could also be sized so that tubing 20 could be secured on the outer surface of the fitting and pipe section assembly 10.

Referring to FIG. 3, the pipe section 12 may be cut along the first and second indicia 17A and 17B. As shown in FIG. 3, the indicia 17A and 17B may be annular grooves in the pipe section 12. These annular grooves act as both a visual guide for where to cut the pipe section 12, but also act to physically guide and center a cutting device. The cutting device may be a blade, cable saw, or any similar device. In a preferred embodiment, the cutting device is a cable saw, which is automatically centered within the groove during cutting. Further, the fitting and pipe section assembly 10 may include the cutting device assembled therewith, such as a cable saw threaded through a polymeric tubing with its ends connected by swaging, wire, or polymeric tie. Once the cutting device has fully cut pipe section 12 along both the first and second indicia 17A and 17B, the center segment 16 may be removed laterally from the pipe section 12, without any longitudinal or lateral displacement of the remaining inlet and outlet portions 14A and 14B. Thus the annular grooves ensure that there is proper spacing for inserting the close fit device 30 (see FIG. 4), and that the inlet and outlet portions 14A and 14B have been cut straight and plumb. The removal of center segment 16 leaves the inlet and outlet portions 14A and 14B, including the first and second fittings 18A and 18B, connected to tubing 20A and 20B.

Referring to FIG. 3-6, once the center segment 16 is removed, the resulting gap has an exact longitudinal dimension to accept a close fit device 30, and outer seals 49A and 49B, between the inlet and outlet portions 14A and 14B of the fitting and pipe section assembly 10. In one embodiment, the indicia 17A and 17B are not placed flush with the fittings 18A and 18B, and are instead positioned a select distance along pipe section 12 away from the fittings 18A and 18B. This results in fitting lips 19A and 19B being

formed when the center segment 16 is removed. The fitting lips are preferably the same width as the outer seals 49A and 49B, and assist in retaining the outer seal 49A and 49B in place against the fittings 18A and 18B. Alternatively outer seals 49A and 49B may include raised portions which can be inserted into corresponding recesses in the vertical
5 faces of fittings 18A and 18B to hold outer seals 49A and 49B in place.

It will be understood that the term "close fit device" 30 as used herein includes a heater device for use in fluid flow communication with a jetted bath, that has a predetermined length which is received between stationary inlets and outlets separated by substantially the same predetermined distance as the length of the device, including outer
10 seals 49A and 49B if necessary, such that it may be installed and/or removed without displacement of the inlet and outlet. Thus, a close fit device 30 may include but is not limited to a heater that includes split nuts as in the embodiment described above. Alternately, the close fit device 30 may include a different fastening assembly construction that allows close fit installation, such as a heater housing utilizing a two
15 piece split nut assembly secured by nuts and bolts or screws that may be slid back sufficiently on the heater body for installation and removal, or a two piece nut and split retaining ring assembly such as is disclosed in U.S. Patent No. 5,775,743 issued to Rochelle, or a split thread nut assembly such as is disclosed in U.S. Patent No. 6,460,901 issued to Rochelle, disclosures of both of which are hereby expressly incorporated by
20 reference, or other well known constructions. The close fit device 30 for use with the present invention includes a main body 32, and inlet and outlet 34A and 34B for fluid flow communication with the jetted bath tubing 20A and 20B located at either ends of main body 32. The close fit device 30 also includes flanges 36A and 36B located respectively at the inlet and outlet ends 34A and 34B of close fit device 30.

Further still, it should be apparent to those skilled in the art that non-close fit
25 devices are also suitable for use with the present invention, such as devices adjustable in length or form to permit insertion of the device between two stationary inlets and outlets. For instance, the present invention is suitable for use with flexible piping, such as PVC piping, wherein the flexible piping is flexible enough to allow the flexible piping with
30 attached end fittings to be inserted between the two stationary inlets and outlets without sliding back the end fittings back upon the flexible piping.

Referring to FIGS. 4-6, the close fit device 30 may be removably secured to the first and second fittings 18A and 18B by a first and second fastening assembly 40A and 40B. In one embodiment shown in FIGS. 4-6, fastening assembly 40A includes a two piece split nut 41A and a nut cover 46A. The fastening assembly 40A preferably also includes an outer seal 49A. The split nut 41A includes locking pins 42A, locking apertures 43, locking tabs 44A, and split nut lip 45A. The locking pins 42A and locking apertures 43 are located along the surfaces dividing the two pieces of split nut 41A. The two pieces of split nut 41A may be removably secured together by locking pins 42A engaging locking apertures 43. The locking tabs 44A are raised projections located on the outer surface of split nut 41A. The nut cover 46A includes locking tab channels 47A, that engage the corresponding locking tabs 44A of split nut 41A. Thus the locking tab channels 47A hold the split nut in place when the fastening assembly 40A is assembled. Fastening assembly 40B is a mirror image of fastening assembly 40A.

To removably seal the close fit device 30 in fluid flow communication with the tubing 20 of the jetted bath, the first and second nut covers 46A and 46B are slidably placed about tubing 20A and 20B respectively. The first and second outer seals 49A and 49B may be positioned between the fittings 18A and 18B respectively and close fit device 30. Once the close fit device 30 is placed between the pipe inlet and outlet ends 14A and 14B, the first and second split nuts 41A and 41B may be slidably secured about the close fit device 30 connecting the two pieces of the split nuts 41A and 41B by inserting locking pins 42A and 42B into and engaging locking apertures 43. Split nuts 41A and 41B rotatably engage the first and second fittings 18A and 18B respectively. The split nut lips 45A and 45B (see FIG. 5) likewise engage the close fit flanges 36A and 36B respectively, thus securing the close fit device to the fittings 18A and 18B. The nut covers 46A and 46B may now be slid so that the locking tab channels 47A and 47B engage the corresponding locking tabs 44A and 44B thus preventing the locking pins 42A and 42B from disengaging locking apertures 43. If the split nuts 41A and 41B are not tightly secured about fittings 18A and 18B, then the nut covers 46A and 46B and the split nuts 41A and 41B may be additionally rotated to tighten the connection between the fittings 18A and 18B and the close fit device 30.

Referring to FIG. 7, the fitting and pipe section 10 is shown with a close fit device 30 fully installed and in fluid flow communication with the tubing 20A and 20B of a jetted bath.

Referring to FIG. 4, it will be understood that the fastening assembly 40A and 40B not limited to those embodiments described herein, but also encompasses any fastener or fastener assembly capable of securing the close fit device 30 to fittings 18A and 18B. Referring to FIG. 8, an alternative embodiment of the fastening assembly 140A is shown. The alternative fastening assembly 140A includes a split nut retainer 81A, union nut 86A and the outer seal 49A. When used to secure the close fit device 30 in fluid flow with the tubing 20A and 20B of the jetted bath, union nut 86A is slid about the close fit device before the close fit device is inserted between the fittings 18A and 18B. Next, the two pieces of split nut retainer 81A can be slidably and removably secured about close fit device 30 between the flange 36A and the union nut 86A. The union nut 86A rotatably engages the fitting 18A and the outer edge of the split nut retainer 81A. The inner edge of the split nut retainer also engages the close fit device flange 36A, allowing union nut 86A to secure the close fit device 30 to the fitting 18A. In another embodiment, a union nut could be slidably secured on the main body 32 of the close fit device 30 by placing the union nut about the main body 32 prior to formation of flanges 36A and 36B, and securing the union nut with the subsequent formation of flanges 36A and 36B. Alternatively, split nuts whose halves can be secured together, for example by either screws or nut and bolt pairs connecting the halves, could also be used as fastening assembly 140A or 140B.

In a second embodiment of the present invention a "T" shaped fitting and pipe section assembly 50 constructed in accordance with the present invention is shown in FIGS. 9 and 10. The fitting and pipe section assembly 50 includes a "T" junction with a transverse aperture 54 in the pipe section 12 between the inlet and outlet 14A and 14B. A transverse pipe branch 52 defining a port extends perpendicular to the pipe section 12 and is connected in fluid flow communication with the transverse aperture 54. The transverse pipe branch 52 includes a transverse flange 56.

In the second embodiment the fitting and pipe section 50 is further capable of being installed with a transverse segment of tubing 22 of a jetted bath. The fitting and pipe section 50 may be removably secured to the transverse tubing segment 22 by

transverse fastening assembly 60. In one embodiment shown in FIG. 9, fastening assembly 60 includes a union nut 64. The fastening assembly 60 preferably also includes an inner seal, such as the inner seal 78 depicted in FIG. 11. The union nut 64 can be slidably retained about the transverse pipe branch 52 by the transverse flange 56.

5 Tubing 22 includes a transverse fitting 24 located at the end of tubing 22. The union nut 64 may removably engage the fitting and pipe section 50 to the tubing 22 by rotatably sealing fitting 24 to the transverse pipe branch 52. Additionally an inner seal may be provided that is captured between the fitting 24 and the transverse pipe branch 52.

It will be understood that alternative elements may be provided for removably
10 engaging the pipe branch 52 to the tubing 22 without departing from the present invention. For example, in another embodiment, the transverse pipe branch 52 could be provided with a fitting and the transverse tubing segment 22 could be provided with a nut to removably engage the transverse pipe branch 52. Additionally, the union nut 64 could be replaced with a fastening assembly similar to those described above, including split
15 nut 41A and nut cover 46A (see FIG. 4), or a split nut retainer 81A and union nut 86A (see FIG. 8).

The center segment 16 may be removed in a similar manner to that provided in the first embodiment. However, if the transverse pipe branch is connected to the center segment 16 of pipe section 12, then the nut 56 must be rotatably disengaged from
20 transverse tube fitting 24 for complete removal of center segment 16.

Referring to FIG. 11-12, once the center segment is removed, the T shaped fitting and pipe section assembly 50 may accept a T shaped close fit device 70 between the inlet and outlet portions 14A and 14B. The T shaped close fit device 70 for use with the present invention includes a transverse aperture 74 between the inlet and outlet 34A and
25 34B. A transverse pipe branch 72 defining a port extends perpendicular to the close fit device main body 32 and is connected in fluid flow communication with the transverse aperture 74. The transverse pipe branch 72 includes a transverse flange 76. The close fit device 70 may be removably secured to the transverse tubing segment 22 by close fit transverse fastening assembly 77. In one embodiment fastening assembly 77 includes a
30 union nut 79. The fastening assembly 77 preferably also includes an inner seal 78. The union nut 79 can be slidably retained about the transverse pipe branch 72 by the transverse flange 76. The union nut 79 may removably engage the close fit device 70 to

the tubing 22A and 22B by rotatably sealing fitting 24 to the transverse pipe branch 72. Additionally an inner seal 78 may be provided that is captured between the fitting 24 and the transverse pipe branch 72. Installation is completed with the fitting and pipe section 50 being secured to the close fit device 70 in the same manner as in the first
5 embodiment. Referring to FIG. 13, the T shaped fitting and pipe section 50 is shown with a T shaped close fit device 70 fully installed and in fluid flow communication with the tubing 20A and 20B of a jetted bath.

In the second embodiment described above, the transverse pipe branch 52 and close fit transverse pipe branch 72 are shown as being centered along the fitting and pipe
10 assembly 50 and close fit device 70 respectively. In another embodiment, transverse pipe branch 52 and close fit transverse pipe branch 72 may be positioned off center.

Referring to FIG. 1, in another embodiment, the center segment 16 may be removably attached to the inlet and outlet portions 14A and 14B of pipe section 12. In this alternative embodiment indicia 17A and 17B are not included, because cutting the
15 fitting and pipe section 10 would be unnecessary. In this embodiment, the center segment could include flanges at its outlet and inlet ends, and could be removably attached to fittings 18A and 18B by fastening assembly 40A and 40B (see FIG. 4).

In an alternative embodiment, the indicia 17A and 17B may include visual guides, including but not limited to paint. This is not preferred, since it is advantageous to
20 physically guide the cutting device to assist in ensuring an acceptable cut.

While the preferred embodiment of the invention has been illustrated and described, it will be appreciated that various changes can be made therein without departing from the spirit and scope of the invention.